OCCUPATIONAL INJURIES AND DISEASES IN ALBERTA

Well Servicing with Service Rigs 1995 to 1999

Upstream Oil and Gas
Sub-Sector #3

Alberta
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1. Introduction

The Mission of Alberta Human Resources and Employment

One of the missions of Alberta Human Resources and Employment is to work in partnership with Albertans to promote safe and healthy workplace, a quality working life and comprehensive safety systems. To this end, Alberta Human Resources and Employment recognises that monitoring health and safety in Alberta will help to ensure primary workplace health and safety concerns are actively managed and prioritised, and resources directed where most needed.

This report summarises the lost-time injuries and disease descriptions, characteristics of the injured worker and the risk of injury to workers in Alberta's upstream oil and gas industries for the years 1995 to 1999. Cost of the injuries and revenue in terms of total premiums paid by employers. Finally, a summary of occupational fatalities accepted by the WCB for compensation and brief descriptions of fatalities investigated by Occupation Health and Safety are also provided.

The purpose of this report is to provide government, employers, workers and health and safety officers in upstream oil and gas industries with information about the industry key health and safety issues.

Description of Upstream Oil and Gas Industries

The upstream oil and gas industries can be subdivided into the following sub-sectors.
Exploration, Oilfield Maintenance and Construction, Well Servicing with Service Rigs and Power Swivels, Drilling of Oil and Gas Wells, Oilfield Downhole and Other Services, Tar Sands, Petroleum Producers, and Oilfield Trucking Services.

The next section gives the descriptions of the Well Servicing with Service Rigs sub-sector.

2. Sub-Sector Description

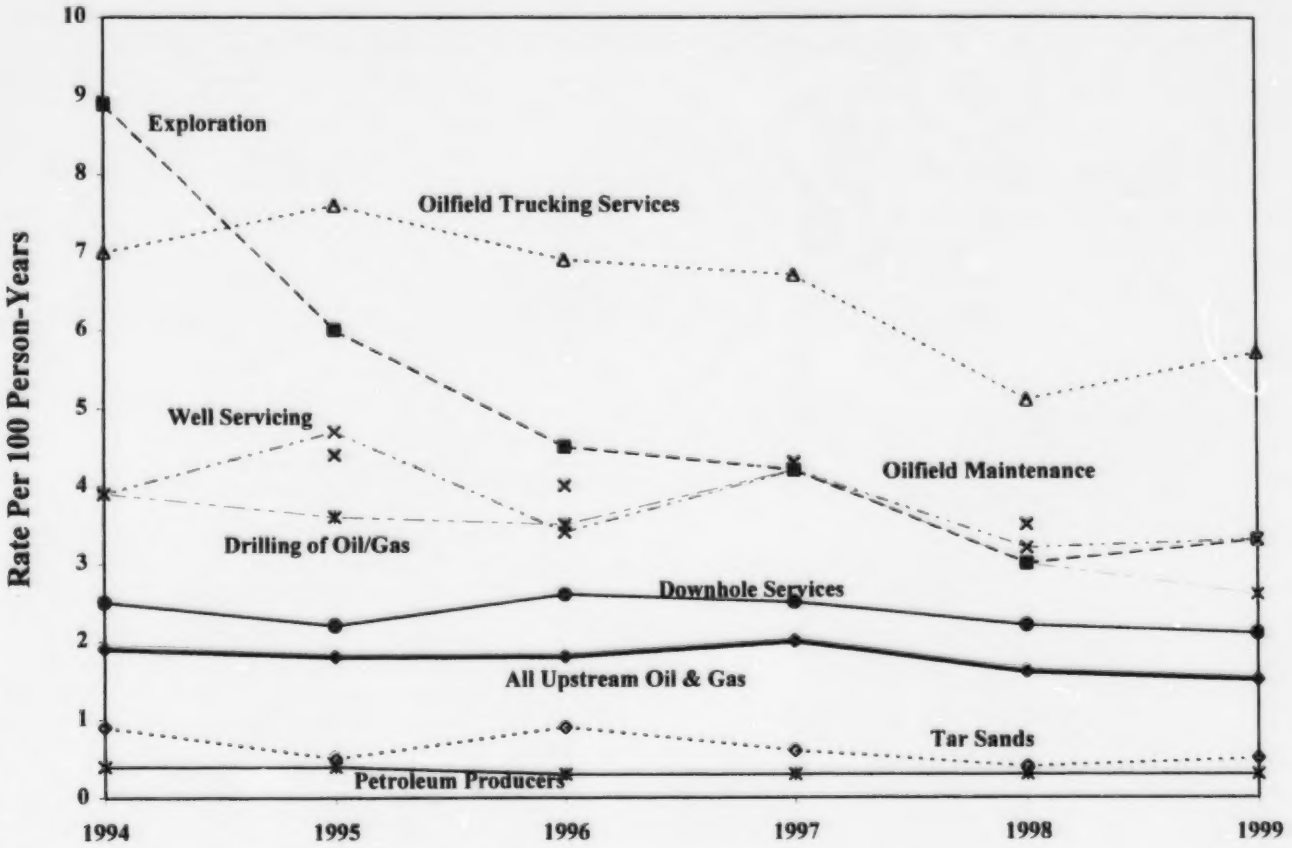
Sub-Sector # 3: Well Servicing With Service Rigs Including Power Swivels

Oil well servicing by means of service rigs including power swivels (Industry # 09903)
This industry is used to cover oil and gas well servicing operations that are conducted with the use of well servicing rigs. Service rigs can be used on well completions once drilling operations have been completed to bring a producing well on stream as well as work over service to existing oil and gas wells. This industry is also used to cover the operation of power swivels used to replace working components of service rigs and work over units.

Service rigs are smaller and more mobile than drilling rigs, (smaller to a large mobile crane) and usually truck mounted. A service rig operator, derrick hand and two floor hands usually make up a service rig crew. Most service rig operators will have shop operations for structural and mechanical repair on their rigs.

Power Swivels are hydraulic motor driven pipe rotating machines specifically intended to replace the drilling swivels, the kelly stem, the kelly bushing and the rotary table on service rigs and work over units. They are trailer mounted and completely portable. Power swivel can be used to provide rotary power for the internal cutting of casing, drill pipe and tubing for drilling out packers, plugs, cement and other obstructions, for milling and scraping, drilling short distances, coring and as a utility tool in fishing operations.

Lost-Time Claim Rates
Upstream Oil & Gas Subsectors
Alberta: 1994-1999



3. Lost-Time Claim Rates and Duration Rates

9903-Well Servicing with Service Rigs

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1995	113	$2,784,272	3,543	8,137	230	166	4.7
1996	116	$1,418,965	4,293	8,832	206	146	3.4
1997	125	$1,543,160	5,055	10,254	203	211	4.2
1998	112	$1,991,375	4,886	9,264	190	158	3.2
1999	123	$1,112,458	4,197	6,448	154	137	3.3

3.1 LTC Rates by Size of Employer: 1999

Size of Employer	# of Accounts	LTCs	Person - Years	LTC Rate
A: 0< PY <=1	29	N/A	13	N/A
B: 1 < PYs < 5	27	4	72	5.6
C: 5 <= PYs < 10	17	6	124	4.9
D: 10 <= PYs < 20	10	5	139	3.6
E: 20 <= PYs < 40	7	11	181	6.1
F: 40 <= PYs < 100	10	19	737	2.6
G: PYs >=100	11	92	2,931	3.1
H: Invalid	12	N/A	0	N/A
Total	123	137	4,197	3.3

4. Analysis of the Lost-time Claims

4.1 Nature of Injury

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
SPRAIN, STRAIN, TEARS	46	36	52	54	42	230	28.1
FRACTURE, DISLOCATION	27	39	49	35	27	177	21.6
SURFACE WOUNDS, BRUISES	36	19	29	10	16	110	13.4
OTHER TRAUMATIC INJURIES/DISEASE	17	13	27	20	21	98	12.0
OPEN WOUNDS	15	7	24	14	7	67	8.2
SYSTEMIC DISEASES,DISORDERS	9	7	13	10	6	45	5.5
BURNS	4	8	7	8	7	34	4.2
MULTIPLE DISEASE, DISORDERS	.	4	3	1	.	8	1.0
OTHER DISEASE,CONDITIONS,DISORDERS	.	.	.	.	3	3	0.4
SYMPTOMS, SIGN/ILL-DEFINED CONDITIONS	.	1	.	.	.	1	0.1
NATURE-UNKNOWN	12	12	7	6	8	45	5.5
Total	166	146	211	158	137	818	100.0

4.2 Type of Event/Exposure

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
STRUCK BY OBJECTS	35	34	55	29	17	170	20.8
OVEREXERTION	25	18	28	20	29	120	14.7
CAUGHT IN OBJECTS	26	17	31	22	19	115	14.1
TRANSPORTATION ACCIDENTS	25	7	14	11	16	73	8.9
BODILY REACTION	9	11	14	14	13	61	7.5
FALL TO LOWER LEVEL	8	6	17	15	7	53	6.5
FALL ON SAME LEVEL	10	12	8	7	8	45	5.5
EXPOSURE TO HARMFUL SUBSTANCES	8	6	9	8	5	36	4.4
FIRES AND EXPLOSIONS	3	5	3	5	1	17	2.1
STRUCK AGAINST OBJECTS	1	3	7	2	4	17	2.1
OTHER FALLS	.	4	4	7	1	16	2.0
REPETITIVE MOTIONS	.	2	5	2	2	11	1.3
RUBBED OR ABRADED	1	.	1	2	2	6	0.7
OTHER CONTACT WITH OBJECT/EQUIP	.	.	1	2	.	3	0.4
OTHER BODILY REACTION/EXERTION	.	.	.	1	.	1	0.1
UNKNOWN	15	21	14	11	13	74	9.0
Total	166	146	211	158	137	818	100.0

4.3 Part of Body Injured

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
BACK	34	36	41	27	33	171	20.9
FINGER(S)	27	18	30	27	12	114	13.9
OTHER TRUNK	15	14	27	14	15	85	10.4
ANKLE(S) & FOOT(FEET)-NOT TOES	15	13	19	16	11	74	9.0
WRIST(S)/HAND(S)	18	12	16	16	11	73	8.9
OTHER HEAD	19	13	19	10	6	67	8.2
MULTIPLE BODY PARTS	13	12	12	10	18	65	7.9
LEG(S)	8	13	15	15	9	60	7.3
OTHER UPPER EXTREMITIES	6	7	17	9	9	48	5.9
EYE(S)	4	2	5	5	5	21	2.6
NECK	5	3	5	4	3	20	2.4
OTHER LOWER EXTREMITIES	2	2	5	2	2	13	1.6
BODY SYSTEMS	.	1	.	.	1	2	0.2
OTHER BODY PARTS	.	.	.	.	2	2	0.2
UNKNOWN	.	.	.	3	.	3	0.4
Total	166	146	211	158	137	818	100.0

4.4 Source of Injury

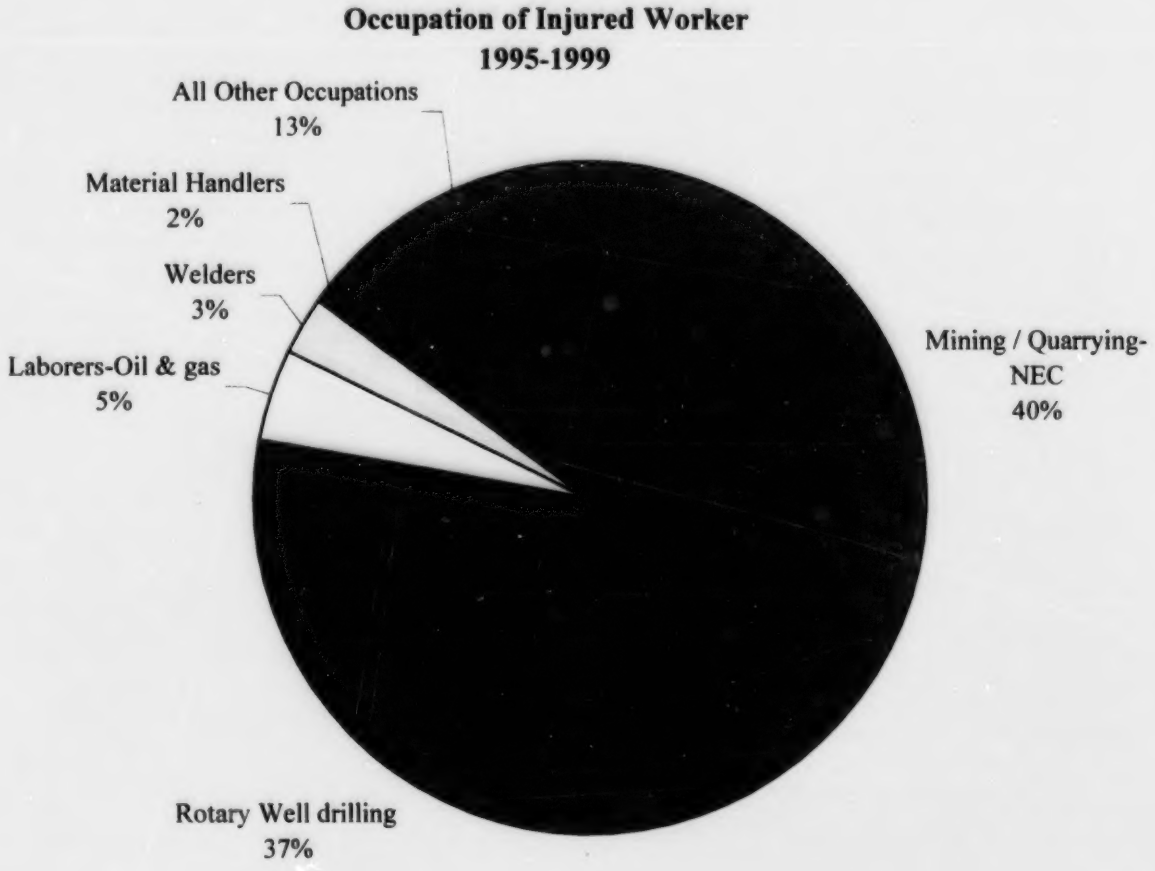
LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
PARTS AND MATERIALS	33	30	51	30	30	174	21.3
STRUCTURES/SURFACES	15	13	27	20	15	90	11.0
VEHICLES	30	9	16	13	18	86	10.5
PERSONS-INJURED WORKER	9	13	18	16	14	70	8.6
HANDTOOLS-UNPOWERED	15	7	14	11	9	56	6.8
OTHER SOURCES	15	10	4	10	5	44	5.4
MACHINERY	6	6	11	7	7	37	4.5
CONTAINERS	5	6	7	6	4	28	3.4
OTHER TOOLS/EQUIPMENTS	.	2	13	5	3	23	2.8
CHEMICAL/CHEMICAL PRODUCTS	2	2	3	4	2	13	1.6
FURNITURE AND FIXTURES	.	1	.	.	1	2	0.2
HANDTOOLS-POWERED	.	.	2	.	.	2	0.2
OTHER PLANTS/ANIMALS/MINERALS	1	.	.	.	.	1	0.1
MINERALS-METALS/NONMETALLIC	.	.	.	1	.	1	0.1
UNKNOWN	35	47	45	35	29	191	23.3
Total	166	146	211	158	137	818	100.0

4.5 Duration of Disability

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
A: 01 Day	5	2	16	7	5	35	4.3
B: 02 Days	4	4	3	10	7	28	3.4
C: 03 - 05 Days	11	11	13	13	9	57	7.0
D: 06 - 10 Days	13	13	31	10	13	80	9.8
E: 11 - 20 Days	35	25	32	22	17	131	16.0
F: 21 - 30 Days	17	13	19	12	13	74	9.0
G: 31 Days OR More	68	69	81	70	55	343	41.9
H: Unspecified	13	9	16	14	18	70	8.6
Total	166	146	211	158	137	818	100.0

5. Characteristics of the Injured Worker

5.1 Occupation of the Injured Worker



5.2 Age of injured Worker

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
A: 15 - 19 Years	8	6	14	7	7	42	5.1
B: 20 - 24 Years	40	41	65	41	37	224	27.4
C: 25 - 34 Years	90	67	93	65	56	371	45.4
D: 35 - 44 Years	20	27	34	37	28	146	17.8
E: 45 - 54 Years	4	4	3	7	5	23	2.8
F: 55+ Years	.	1	2	1	4	8	1.0
G: Unspecified	4	.	.	.	.	4	0.5
Total	166	146	211	158	137	818	100.0

5.3 Length of Time Employed

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
A: LESS THAN 1 MONTH	27	34	43	14	15	133	16.3
B: 1 MONTH TO < 6 MONTHS	48	30	53	30	25	186	22.7
C: 6 MONTHS TO < 1 YEAR	19	14	19	20	12	84	10.3
D: 1 YEAR OR MORE	44	26	28	29	25	152	18.6
E: TIME UNSPECIFIED	28	42	68	65	60	263	32.2
Total	166	146	211	158	137	818	100.0

5.4 Gender of Injured Worker

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
MALES	162	142	206	157	137	804	98.3
FEMALES	1	1	.	1	.	3	0.4
UNSPECIFIED	3	3	5	.	.	11	1.3
Total	166	146	211	158	137	818	100.0

6. Cost of Claims and Employer Premiums

Sub-Sector 3-Well Servicing with Service Rigs

	OCCURRENCE YEAR				
	1995	**1996**	**1997**	**1998**	**1999**
TRANSACTION YEAR					
1995	$1,574,027				
1996	$659,819	$1,141,757			
1997	$283,810	$752,508	$1,260,448		
1998	$437,651	$1,244,880	$590,179	$1,689,829	
1999	$432,599	$1,299,635	$499,608	$1,107,205	$1,198,907
Total Cost	$3,387,905	$4,438,781	$2,350,235	$2,797,035	$1,198,907
Total Premiums	$7,883,894	$7,732,254	$10,341,246	$5,349,653	$3,400,012

The above claim cost and employer premiums are for the five-year period 1995 through 1999. The data is as at July 5, 2000.

The cost of claim amount reflects only paid cost on claims that have occurred in the five-year period. The claim costs are tracked by occurrence year and the year that the costs were transacted.

The premiums are the total of all premiums paid by employers in each year.

7. Occupational Fatalities

An occupational fatality is the death of a worker that results from a work-related incident or exposure. Alberta Human Resources and Employment classifies occupational fatalities into three general types: motor vehicle incident, workplace incident and occupational diseases. Each is described in detail below.

Motor Vehicle Incident

Motor vehicle incidents typically involve highway vehicles operating on public roads in which the fatally injured worker was either the driver or a passenger. This category also includes fatalities involving aircraft crashes, train crashes, helicopter crashes, etc.

Workplace Incident

Fatal workplace incidents consist of cases in which the worker dies at a work site, or as a result of injuries sustained at a work site. It is this type of fatality that Alberta Human Resources and Employment may be responsible for investigating.

Occupational Diseases

Occupational disease fatalities consist mostly of recognized occupational disease, that is, disease known to be primarily or exclusively work-related (e.g. asbestosis, black lung disease). Occupational diseases are frequently diagnosed many years after the initial or crucial exposure to the toxic substance, and in such cases it is very difficult to determine when the fatal exposure occurred. Thus, the occupational disease category should not be interpreted to reflect present work site hazardous conditions or exposures.

Each year the Workers' Compensation Board (WCB) accepts some occupational fatality claims for compensation. Occupational fatality claims that were accepted in a particular year may include fatalities from prior years.

Description of Well Servicing Workplace Fatalities Accepted by the WCB Alberta: 1995-1999

Year	Occupational Disease		Motor Vehicle incident		Workplace Incident		Total	
	N	%	N	%	N	%	N	%
1995	0	0.0	5	71.4	2	28.6	7	100
1996	0	0.0	0	0.0	2	100.0	2	100
1997	0	0.0	1	100.0	0	0.0	1	100
1998	0	0.0	1	33.3	2	66.7	3	100
1999	0	0.0	2	66.7	1	33.3	3	100
Total	0	0.0	9	56.3	7	43.8	16	100

8. OHS Investigated Occupational Fatalities: 1995-1999

YEAR:	1995	FILE:	0811
OCCUPATION:	Roughneck	AGE:	20
INDUSTRY:	Well Servicing with Service Rigs		
EXPERIENCE:	4 months		

DESCRIPTION: At a recently drilled gas well, the service rig workers were in the final stages of well completion, which was to remove the blow out prevention unit (BOP) and prepare installation of the master valve. When the hoist line was raised, the sling tightened up against the pipe nipple and pulled the pipe nipple out of the THS. The pressure in the well head propelled the pipe nipple away from the THS and struck the worker who was in the path of travel.

YEAR:	1995	FILE:	0826
OCCUPATION:	Rig Repairer	AGE:	25
INDUSTRY:	Servicing of Gas and Oil Wells by means of Service Rigs		
EXPERIENCE:			

DESCRIPTION: A well servicing company was contracted by an oil company to rework a well that had been shut-in for six months. The crew prepared the rig matting and the rig was centered over the well. When the rig up was completed, reverse circulation (pumping down casing) was tried and was unsuccessful due to wax build up. The crew decided to back off the rod string by using two 0.91 m. pipe wrenches across from each other on the polish rod clamp. There were two workers on each wrench, one pulling and the other pushing. About 10 to 15 anti-clockwise turns of torque were applied to the rod string. Control on the wrenches was lost and one of the wrenches flung around clockwise fatally injuring one worker and knocking the second worker unconscious.

YEAR:	1996	FILE:	0848
OCCUPATION:	Roughneck	AGE:	24
INDUSTRY:	Well Servicing with Service Rigs		
EXPERIENCE:	1.75 years		

DESCRIPTION: A service rig was swabbing the contents of an oil well located near Taber, Alberta. The work was being performed as a part of a completion program to bring the well into production. The oil company had contacted the consultant in charge of the job site and asked that swabbing be stopped. They asked that a sample of the produced fluids be take and that tubing be removed from the well so they could seal off the zone producing water. The roughneck took a sample of the produced fluids at the rig tank entry hatch and was later seen standing between the rig tank and the rig pump. The rest of the crew removed the swabbing equipment from the service rig. It is unknown why or when, but the roughneck who took the sample returned and entered the rig tank. As the crew were pulling the tubing, the rig manager found the roughneck who had taken the sample floating in the produced fluids in the tank. The roughneck was rescued by the crew and given two man CPR until they were relieved by ambulance attendants. He was transported to the hospital where he was pronounced dead from drowning.

YEAR:	1998	FILE:	0887
OCCUPATION:	Derrickman	AGE:	33
INDUSTRY:	Servicing of Gas and Oil Wells by Means of Service Rigs		
EXPERIENCE:	Unknown		

DESCRIPTION: The worker was in the process of rigging out the tubing board of a service rig. He had connected his fall arrest line and disconnected his positioning lanyard. The fingers on the tubing board had been spread apart and the worker was standing on the diving board. As he turned, the worker slipped and fell through the hole left by the fingers. The worker fell approximately 4 metres until the fall arrest cable tightened. When the cable tightened it separated and the worker fell to the ground. The worker died as a result of injuries sustained in the fall.

YEAR:	1998	FILE:	0888
OCCUPATION:	Derrickhand	AGE:	26
INDUSTRY:	Servicing of Gas and Oil Wells		
EXPERIENCE:	4 years		

DESCRIPTION: A service rig crew was inserting the last joint of pipe into a well. The derrickhand was working on the tubing board, wearing a harness attached to a 1.8 m (6 feet) working lanyard, anchored to the tubing board rail. After the derrickhand positioned the joint of pipe, the operator instructed him to Arig out@ the tubing board (in preparation to dismantle the rig).

In the process of rigging out, the derrickhand transferred from his working lanyard to the retractable life line, used for going up and down the derrick ladder. The retractable life line was anchored to the crown of the derrick, above the ladder. He was working on the tubing board, therefore the retractable life line was across the path of the travelling blocks.

The blocks were still in motion and caught the retractable life line, pulling the derrickhand off the tubing board. The blocks sheared the line and he fell to the ground and sustained fatal injuries.

YEAR:	1999	FILE:	0923
OCCUPATION:	Operations Manager	AGE:	49
INDUSTRY:	Servicing of Gas and Oil Wells by means of Service Rigs		
EXPERIENCE:	23 years in Oilwell Servicing		

DESCRIPTION: An old oilfield pump truck was brought into the company's head office yard for servicing. The Operations Manager asked the worker to back the truck over to a skid mounted pump in the middle of the yard. The Operations Manager wanted to move the skid mounted pump over approximately two metres to the west.

The Operations Manager stood between the truck and the skid in preparation of wrapping the truck's winch cable around the skid. The worker climbed onto the deck of the truck to operate the winch from the auxiliary control panel. The Operations Manager instructed the worker to increase the throttle to speed up the winch as the cable was reeling out too slow. As soon as the throttle was increased, the truck accelerated backward pinning the Operations Manager between the pump skid and the truck and fatally injuring him.

Appendix A: Terms, Definitions, and Formulas

Lost-Time Claim

A lost-time claim (LTC) is a claim for an occupational injury or disease which disables the worker beyond the day of injury. Included are claims for which wages compensation are paid, permanent disability claims, fatalities, and cases in which the injured worker is assigned light duties or other modified work.

Person-Years

Person-year estimates are calculated from wage and payroll data provided by account holders to the WCB. Alberta Labour uses these data to estimate. An average industry wage, and uses the average industry wage and employer payroll data to estimate person-years foe each employer and each industry. One person-year ie equivalent to one full-time worker working for one year, and can be assumed to equal 2,000 hours worked.

LTC Rate

The lost-time claim (LTC) rate is calculated by dividing the number of lost-time claims by the person-year estimate, and multiplying the result by 100. The LTC rate represent the probability or risk of disabling injury or disease to a worker during a period of one year=s work. Comparisons of LTC rates between industries, or between years, can be used to indicate increases, decreases, or differences in this risk.

$$\text{LTC Rate} = \frac{\text{Number of LTCs X 100}}{\text{Estimated Person-years}}$$

Duration (Days Lost)

The duration of disability is the number of days following the injury or disease for which the worker was disabled, and unable to perform normal work duties. This information is obtained for this report from data on compensation days paid on each claim from WCB. Alberta Labour obtains these data on March 31 of the year following the claim year, and does not update the information, even though many injured workers continue to be disabled beyond this date. As a result, the duration information reported here underestimates the true impact of lost-time injury and disease.

Duration Rate

The duration rate is calculated by dividing the number of work days lost (disability days) by the person-year estimate, and multiplying by 100. The result is expressed as Adays lost per 100 person-years worked@, and indicates, in part, the economic impact of occupational injury and disease. Duration rates are not recommended as reliable indicators of full economic cost. In addition, readers are warned that duration rates are highly unstable when based on only a few lost-time claims; it is recommended that the duration rate not be calculated based upon fewer than 30 lost-time claims.

$$\text{Duration Rate} = \frac{\text{Disability Days X 100}}{\text{Estimated Person-Years}}$$

WCB Accepted Fatality

An occupational fatality is the death of a worker which result from a work-related incident or exposure and which has been accepted by the WCB for compensation. A fatality is counted in the year it is accepted.

NEC

Means "Not Elsewhere Classified"

UNS

Means "Unspecified"

Appendix B: Upstream Oil and Gas 1999 Industry Codes

Sub-Sector 1: **Exploration**
Industries: 09200~Seismic Geophysical/Mineral Exploration
09201~Shot Hole Drilling

Sub-Sector 2: **Oilfield Maintenance and Construction**
Industries: 06304~Oilfield Construction and/or Maintenance

Sub-Sector 3: **Well Servicing With Service Rigs**
Industries: 09903~Well servicing with Service Rigs including Power Swivels

Sub-Sector 4: **Drilling of Oil and gas Wells**
Industries: 09600~Drilling of Oil & Gas Wells

Sub-Sector 5: **Downhole & Other Oilfield Services**
Industries 06305~Field Production Operators
06306~Vacuum Removal of Waste
09900~Mud Logging
09902~Pressure Cleaning Services
09904~Rathole Drilling and Rig Anchoring
09911~Oilfield Downhole Services
09915~Well Casing Services
09921~Servicing Christmas Trees On Oil Wells
09927~Liquid Waste Treatment & Disposal

Sub-Sector 6: **Tar Sands**
Industries: 06600~Mining & Processing of Bituminous Sand
06601~Research/Development, Oil Sands and Heavy Oil Recovery

Sub-Sector 7: **Oil & Gas Exploration/Development**
Industries: 06300~Oil and Gas Exploration & Development-Upstream Operations

Sub-Sector 8: **Oilfield Trucking Services**
Industries: 50720~Oilfield Trucking Services